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ABSTRACT

Comparative statistical data are presented on speech dynamic (as contrasted with lexical and rhetorical) aspects of major speech styles. Representative samples of story retelling, lectures, speeches, sermons, interviews, and panel discussions serve to determine posited differences between casual and careful speech. Data are drawn from 15,393 syllables of various kinds of natural speech in recorded and transcribed form. Frequency of occurrence of three prominent absorption processes, whereby strings of discrete citation forms are transformed into speech dynamic events, are charted. Such absorption phenomena are shown to facilitate ease-of-articulation adjustments and can make explicit what is ultimately perceived as fluent speech. Given appropriate environments, a comparison of potential to actual dynamic speech occurrences shows that the variable rules of speech production investigated here exhibit a consistently high actuation rate of about 75 percent across both speech styles. Implications for second language instruction to develop fluent speech strategies are discussed, particularly use of an "increments of knowledge" approach, effective with already partially competent learners, that is seen as more effective than the customary full "body of knowledge" approach. Contains 36 references. (MSE)

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ON THE DYNAMICS OF CASUAL AND CAREFUL SPEECH

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ABSTRACT

This report presents comparative statistical results on speech dynamic (as opposed to lexical and rhetorical) aspects of major speech styles. Representative samples of story retelling, lectures, speeches, sermons, interviews, and panel discussions serve to determine posited differences between casual and careful speech. The frequency of occurrence of three prominent absorption processes--whereby strings of discrete citation forms are transformed into speech dynamic events--are charted. Such absorption phenomena are shown to facilitate ease-of-articulation adjustments and can make explicit what is ultimately perceived as fluent speech. Given appropriate environments, a comparison of potential to actual dynamic speech occurrences shows that the variable rules of speech production here investigated exhibit a consistently high actuation rate of about 75% across both speech styles.

An application of the insights gained from the long-term research effort here summarized suggests fluent speech strategies for L2 instruction. Developing oral competence by means of a sophisticated 'increments of knowledge' approach--effective with already partially competent learners--appears more attractive than the full 'body of knowledge' approach customary in standard comprehensive L2 programs.

Introduction

Whenever language is phonated, discrete citation forms (words) become transformed into speech dynamic events (strings of connected speech). This resulting acoustic stream of speech provides ample evidence of both the range and degree of absorption which the metamorphosis from form to event domain regularly sets off in the quasi-uninterrupted speech manifestations as they are normal and familiar to us all.

The research findings reported here conclude and summarize a long-term effort toward specifying the properties of the spoken language through an analysis of the acoustic record of running speech. Earlier work in this area isolated three major classes of absorption phenomena (of altogether twenty-two discrete types; cf. Hieke 1984 and 1987): linking (as in the common type of 'consonant attraction'--with concommitant resyllabication--as in [kəm.pleyn.də.bauwt], with [.] indicating speech dynamic syllables); levelling (as in in the frequent 'vowel reduction' to schwa, i.e. than in [les.ðən.faiv],); and finally loss (such as of a consonant as the [d] in and [pətsən.pənz] or of vowels and even syllables, viz. [fəm.liy]). Previous work also yielded average frequencies of occurrence for each of the three major classes as baseline data for characterizing casual speech.

Since it is commonly assumed that careful speech differs from casual speech in important respects (variously interpreted in Horowitz and Samuels 1987; Adamson 1988; Levelt 1989; Young 1990; more below), this assumption is here tested experimentally for speech dynamic features. For comparative purposes, the same method and procedures as in the earlier investigations into casual speech (for details, cf. Hieke 1984; 1987; 1990) were used again to derive parallel results on representative samples, this time of careful speech.

Once again, natural speech samples were chosen to meet the criteria first specified by Joos (1967) as characteristic of careful speaking styles (more under 'terminology' below). Comparative statistics are then used to show to what extent common claims about speech dynamic properties are justified.

At present, investigations into the **nature** of absorption processes are pursued more often than those into **frequency** of their occurrence (cf., for instance, Arnold and Hansen 1979; Bailey 1983; Browman and Goldstein 1990; Brown 1977; Dalby 1986; Dickerson 1989; Fujimura and Lovins 1982; Kahn 1976; Kaisse 1985; Klatt 1980; Koster 1987; Rubach 1984; Selkirk 1982). Although an understanding of the prevalence of absorption phenomena in connected speech seems crucial for delimiting the character of their parameters, there is less focus on the frequency component

in the literature (but cf. Bailey 1978; Dalby 1986; Hiller 1983; Koster 1987; Labov 1987). Hence a comprehensive theory of the spoken language remains a still distant goal, but a focus on the frequency component is pursued here to stimulate that aspect.

With improved instrumentation and the recently developed realtime capability of acoustically displaying 'spread speech' much like slow motion in the visual realm, data analysis can be improved considerably. When freed from the time constraints of a realtime display, it stands to reason that the record is enhanced in the acoustic just as in the visual medium. The utilization of instrumentally slowed, natural running speech of any desired length then facilitates a more sophisticated perceptual analyses. Significantly, a perceptual approach also reflects the normal human capabilities much more naturally (and it circumvents the inevitable abstractions of spectographic analysis, though, on the other hand, it must rely on trained raters' judgments).

Just as slow motion reveals details entirely hidden or severely masked at normal projection speed, slowed speech in like fashion permits the observation of dynamic speech phenomena in unusual clarity and prominence. As a rule, that effect appears quite striking to the investigator at first, especially since the energy display can be manipulated in tempo without discernible natural frequency distortion.

The display limit of sound spectograms and the difficulty in consequently interpreting non-auditory running displays of acoustic energy in a derived, visual dimension have complicated a straightforward, psychologically real study of running speech. Though such an established means of displaying speech can chart the presence of acoustic energy in some fashion, it cannot detail its absence for interpretative purposes, of course. Where speech dynamic events appear as silent intervals concatenated with acoustic energy, such as phonation containing silent state portions or other communicative silences such as pregnant pauses, these do not leave a trace on graphs, of course, because only acoustic energy can activate a level recorder. In that respect, a perceptual interpretation of a direct acoustic record has advantages over a visual record since the communicative function of silent portions is nevertheless overt and within the competence of every native listener to interpret.

A direct image of the interactive process of sound generation is thus made possible via realtime audio recordings; moreover, each dynamic representation as continuous phonated speech can now be stretched sufficiently to allow close and prolongued perceptual examination (though a supplementary visual record in form of a transcription or even a spectogram at points where the auditory energy display by itself is sufficient will always be helpful).

On Terminology

Following Joos (1967) and Gleason (1965), H.D. Brown recognizes five separate speech styles. Briefly, these are:

> (1) oratorical, or frozen; (2) deliberative, or formal; (3) consultative; (4) casual; (5) intimate. An oratorical style is used in public speaking before a large audience; wording is carefully planned in advance, intonation is somewhat exaggerated, and numerous rhetorical devices are appropriate. A deliberative style is also used in addressing audiences, usually audiences too large to permit effective interchange between speaker and hearers, though the forms are normally not as polished as those in an oratorical style. A typical university classroom lecture is often carried out in a deliberative style. A consultative style is typically a dialogue, though formal enough that words are chosen with some care. Business transactions, doctor-patient conversations, and the like are usually consultative in nature. Casual conversations are between friends or colleagues or sometimes members of a family; in this context words need not be guarded and social barriers are moderately low. An intimate style is one characterized by complete absence of

social inhibitions (1987, 208).

For most linguists, the first three styles together are considered the more formal (viz. MacKay 1987, 20) and clearly represent more careful speech than casual and intimate styles, so that Labov's (1969) terminology of careful and casual speech has found general acceptance and is thus followed here. As defined for purposes of the earlier studies by the present author,

> Casual speech refers to the normal, everyday use of language...but the term in no way implies 'colloquial to the extent of being substandard'. Careful or deliberate speech...refers to the careful, even-measured speech reserved for formal occasions, such as official speeches, lectures, sermons, recitations, and presentations (Hieke 1984)*.

The whole notion of fast speech--persistently used by practitioners without specifying concrete temporal terms--nevertheless suggests a higher than normal speed of delivery: The higher the speed, the more radical the reductions, etc. The basic problem with this kind of thinking is that, as Dalby, for one, points out: "Phonologists who have studied casual or fast speech (Bailey 1978; Stampe 1979; Zwicky 1972a, 1972b) have relied on intuitive and/or [sic] anecdotal data for the most part" (1986,

71). Not only is the terminology vague, then, but it may have become applied to anecdotal evidence and is thus devoid of empirical vigor, a situation not conducive to a better grasp of the subject matter.

To make matters worse, the already imprecise notion of fast speech has become widely adopted without cognizance of the difference in the variables involved: Speech rate on the one hand, and articulation rate on the other, with divergent effects on the temporal structure of language. What is perceived as a change in speed of delivery is more often due to a variation in the amount and frequency of pausing as reflected in speech rate (phonated speech over time including pausing) rather than in the separate articulation rate (phonated speech over time excluding pausing). The latter is normally less often subject to significant temporal fluctuations, while speech rates in spontaneous speech typically do fluctuate considerably from utterance to utterance, even within utterances, and that especially so in dyadic speech forms (for a thorough critical analysis of such issues, cf. Kowal 1991 and O'Connell 1988).

Thus any change in speed of delivery is generally a product of pausing behavior and hence less a factor in articulatory accommodation during phonation. It therefore cannot have as much impact on articulatory adjustment processes as has been assumed,

and consequently is unlikely to generate absorption processes in the substantive way suggested by the present use of the term 'fast speech'.

Altogether, speed of delivery may prove to be less a primary variable than a secondary effect of more paramount factors exerted by the major speech styles themselves. Hence 'casual' and 'careful' speech modes would then in fact govern absorptive processes in primary ways rather than be merely symptomatic of them. Such a hypothesis appears plausible but awaits confirmation; until that time, the notion of fast speech should be used with much care and greater reservation.

Method

Based on a corpus of a total of 15,393 syllables of various kinds of natural speech in recorded and transcribed form, spontaneous manifestations of what are conventionally considered representative samples of casual as well as careful speech were prepared for analysis by means of an MXR Model 129 Pitch Transposer, a Revox B 77 MK II Special Stereo Tape Recorder and B 77 Variable Speed Control. The taped acoustic record was subjected to a rate reduction of 50% of original speed. The signal was restored to natural frequencies by means of pitch transposition

to facilitate its perceptual analysis, in each instance utilizing at least two trained observers. In those instances where these were not in clear agreement, the count of that phenomenon was rejected to assure that the results are based on clear cases. To minimize transcriber bias, only the author was aware of the hypothesis to be tested.

The data base consisted exclusively of productive speech (as opposed to reproductive speech such as prose and poetry readings), that is variously formal lecturing, public speaking, interviewing, and story telling. The speech samples were either elicited in a paraphrase task (for casual speech samples) or excerpted from extemporaneous university lectures, public speeches, sermons, radio interviews and panel discussions (for careful speech samples).

The results were averaged and computed to yield both number of occurrences per 100 syllables (as only mean counts in a ratio to overall text make cross-comparison studies possible) and the ratio of actual to potential occurrences (to determine potential occurrences, context-sensitive constraints were strictly adhered to).

The three classes of phenomena isolated in previous work as representative of common absorption phenomena in American English

native speakers had led to a concentration on those types that could be charted in relatively unproblematic ways. For that reason and to permit comparisons, the earlier experimental method and procedures were replicated here for an investigation of the representative careful speech samples. The investigation therefore focused on the following processes (briefly described here; for a detailed treatment, cf. Hieke 1984, 1987):

1. Consonant Attraction, an instance of linking, for example in far away rendered as /fa.rə.wey/. The periods inserted to indicate syllable boundaries show how resyllabication results. Essentially, this process causes a syllable-final consonant to become linked to the next syllable if that starts with a vowel.

2. Alveolar Flapping, an instance of levelling, for example in utility rendered as /yuwtiliɾiy/. Essentially, alveolar stops in intervocalic position undergo voice assimilation and are levelled to a flap.

3. Consonant Cluster Reduction, an instance of loss, for example in twenty rendered as /tweniy/ or kinds of as /kaynzəv/. The rocker indicates that ambisyllabicity results. Essentially, initial as well as final consonant clusters are simplified through loss, here of the stop in the sequence in proximity of a nasal.

Results

A corpus of 15,393 syllables in texts representative of what are conventionally considered casual and careful speech styles served to chart the prevalence of three representative absorption processes classified as linking, levelling, and loss. Averaged measures of these three classes were compared across the two conventional speech styles to determine the extent to which hypothesized differences are actually extant.

Contrary to prevailing expectations, the frequency of occurrence of the three processes turns out to be markedly even across speech styles, as seen in Table 1. For casual speech per 100 syllables as opposed to careful speech, the resulting figures for linking turn out to be 12.12 and 12.95, respectively, 2.26 and 2.90 for flapping, and 2.23 and 1.99 for cluster reduction. Then, with their means averaged to yield their predictive power in speech overall, baseline data expectations of 12.53 for linking, 2.58 for flapping, and 2.11 for cluster reduction per 100 syllables are predicted, as also shown in Table 1.

Dynamic speech features to the extent investigated here are thus seen to be quite similar in how absorption processes affect

casual as well as careful speech. These findings lend experimental support to expectations previously expressed by Kaisse: "I do not think that there is a theoretically useful distinction to be drawn between connected speech rules applicable in formal versus informal speech...there are rules of connected speech...that apply at normal rates or even in slow, formal speech" (1985, 8).

For a comparison of possible differences among individual modes, careful speech styles were next divided into lectures, public speeches, as well as dialogic and multilogic uses as in interviews and panel discussions. The results once again show an average occurrence of absorptions per hundred syllables quite uniform across genres: Linking occurs with a frequency of 13.09 in lectures, 11.99 in public speeches and sermons, and 13.75 in interviews and panel discussions; the corresponding figures for flapping are 3.45, 2.85, and 2.94; for cluster reduction, they are 2.26, 0.42, and 2.89, in all cases again per hundred syllables, as shown in Table 2.

The results derived from this study indicate how pervasive different dynamic speech processes in connected speech use really are. Moreover, when computed according to a potential to actual ratio, such baseline measures can also reveal with what regularity such rules--variable rules in nature--actually become activated, thus demonstrating what opportunities and limitations

are governed by the text itself. Beyond frequency of occurrence counts per hundred syllables, a ratio of potential to actual occurrences was therefore computed. The results across linking, levelling, and loss are once again quite similar, with actuation rates of 78.02% for linking in casual speech and 77.56% in careful speech; for flapping, the figures are 76.12% and 78.21%, and 71.43% and 76.12% for cluster reduction, respectively, as shown in Table 3. Their means, in turn, were averaged to gain predictive power for the data as a whole and to represent baseline measures. The results lead to actuation rate expectations per hundred syllables of 77.79% for linking, 77.16% for flapping, and 74.08% for cluster reduction.

To summarize, the experimental examination of major speech style features reveals, first of all, a consistent incidence of absorptive processes, and secondly a high ratio of actual to potential occurrences of such phenomena in American speech. Actuation rates with magnitudes of about 75% or more, as seen here consistently, clearly point to the existence of variable rules of very high potential in American English. Not only is this true for major speech styles as such, but quite strikingly also regardless of how severely citation forms may become altered by absorptive processes, that is whether through relatively mild resyllabication as a product of linking or, for example, through radical phoneme loss due to consonant cluster reduction.

Discussion

If this statistical analysis of three absorption processes in dynamic speech is extrapolated to absorption phenomena in general, American speech is seen to be considerably pervaded by absorption. In view of the fairly uniform values across the spectrum under investigation here, future more comprehensive studies can be expected to portray a similar picture of the prevalence of linking, levelling, and loss.

There can be little doubt that the more casual speech styles are in some ways different from the more careful speech styles found in spontaneous running speech, but evidently not in the prevalence of speech dynamic features. Whatever differences are to be found appear to exist rather in the formality of rhetorical style and choice of vocabulary, as the characterizations at the outset indicate. Such higher order differences reported in the literature appear to affect speech styles differently because they are not governed by form but by the content domain. Among the more fundamental processes are, of course, rhetorical features, but surprisingly, these have not been studied empirically from the frequency viewpoint to any degree. Frequency measures already do exist for contractions, for one, incidentally

also with results indicating a typical actuation rate of 75% (Hiller 1983). But whatever the differences--often merely perceived intuitively and cited anecdotally, though--much more research is called for to demonstrate just how prevalent they are and where their locus points lie.

Answers here would be especially interesting since at least this research shows that dynamic speech phenomena, though they merely constitute variable rules, do occur with unexpected prevalence. Yet, apparently they cannot in themselves characterize distinctions of casual or careful speech. All that can be said is that absorption phenomena are actuated as a reflex of temporal and articulatory exigencies of ongoing speech production and occur with high probability.

Applications

Studies to explore the parameters of the spoken language concretely specify subtle but prominent realities of connected running speech, and insights into the details of fluent speech production (and, consequently, listening comprehension) can be of import particularly to second language acquisition research and application. Second language fluency strategies promise to help bridge the gap between a learner's competence in knowing about another language and the much more elusive competence in using it

effortlessly and confidently, a gap perpetually decried as one of the greatest impediments to second language learning.

Whether it is adviseable to present such a body of knowledge very explicitly (as attempted in Dickerson 1989, for example), or more implicitly (cf. Dunbar and Hieke, 1985) will be decided on pedagogical grounds or by practical experimentation. But even a brief overview such as that presented here should leave no doubt that such phenomena can be taught and learned in realistic ways.

At first sight, the task of assimilating a host of dynamic speech facts may appear forbidding to curriculum planners and classroom teachers. However, it may become rather more feasible if conveyed by the new methodology of remainder learning now gaining momentum, where learners are credited with at least some prior accumulations of knowledge in the subject matter (unless they are raw beginners), making a tabula rasa approach to teaching needlessly redundant. Remainder learning implies a fundamental reorientation in language learning and teaching away from the traditional 'full body of knowledge' approach. The latter approach is thought to be useful mostly with learners as beginners, but may no longer effectively address the large body of post-novice learners in any educational system where a certain amount of prior competence can be taken for granted.

Instead, this promising approach centers on the more sophisticated 'bits or increments of knowledge' pedagogy that fits partially competent speakers with a series of selected focal points--such as performance features, as would be relevant in the present context. A curriculum with this focus is built around a gap-filling strategy for transmitting knowledge; it depends on some foundational competence level and concentrates on filling gaps between existing areas of knowledge--without, significantly, creating the enervating overkill effect which information overlap tends to cause: why teach portions of the known at successive increments of the curriculum just to assure complete coverage of the information complex (or to rigorously review it) when new information to round out the learners competence would appear more purposeful--and considerably more appreciated by them?

In terms of marking theory, teaching marked (i.e. often exceptional) features at the same time as the unmarked (i.e. regular) ones can create information overloads for the learner and tends to make the task appear forbidding, and certainly confusing, something that most language learners have experienced at some point. In terms of fluency strategies, dynamic speech phenomena such as resyllabication, ambisyllabicity, and articulatory simplifications promoting ease-of-articulation, though they typify the spoken language, are hardly taught or practiced consistently and systematically in spoken language practice

programs so far, but definitely could be, as the discussion here tries to demonstrate.

With the goal of second language learning increasingly being one of speaking proficiency (such as 'conferencing' as the goal in ESP--English for Specific Purposes--programs at European universities) we are remiss in not conveying the properties of the spoken language to our learners in a principled manner. **

*Unfortunately, due to the coining of 'fast speech' as it has entered current terminology, distinctions between fast and slow, casual and careful or deliberate, formal and informal speech are becoming blurred. Careful speech is increasingly identified with slow speech and somewhat more careful articulation, and consequently thought to be subject to fewer absorptive effects. Laubstein in fact considers it "very slow, citation-type speech" (1988, 71); Dalby maintains that "fast or casual speech [note: fast = casual!] is typically reduced or under-specified compared to careful speech (1986, v); Murphy, following terminology current in second language learning literature, contrasts "slow, deliberate speech; fast, fluent speech" (1991, 63) in clearly polar fashion; Browman and Goldstein distinguish "careful pronunciation: from "faster, casual speech" (1990, 360) and confuse the issue further by offering the nonsensical definition of casual speech as "that subset of fast speech in which reduc-

tions typically occur" (359; cf. also Zwicky 1972a), as if reductions untypically occur in other subsets. Such an implication of fairly sharp divisions is evident in MacKay, where "four major manifestations of casual pronunciation" are listed: Contractions; Accommodation and Sandhi {that is, absorption phenomena}; Ellipsis; and Dialect Features (1987, 19-20). Yet it could hardly have escaped any of the sources cited above that all such features regularly occur in careful speech as well, except that the frequency question has not been addressed sufficiently to settle the issue.

The fact is, as Kaisse's investigations make clear, that "casual speech is not necessarily casual" (1985, 8). Levelt adds that in general, "connected speech need neither be casual nor fast. There are general properties of connected speech that arise independent of its speed or its formality: (1989, 368). Kaisse, furthermore, wishes to "lay to rest the misapprehension of many linguists that rules of casual connected speech are often just sloppy articulations" (1985, 125). Just as so-called hesitation phenomena constitute impediments to fluent speech only in the most superficial sense, the temporal and articulatory communication channel constraints on running speech in form of absorptive processes are actually **wellformedness** phenomena and should be understood as such. Above all, the relevant research clearly indicates that listeners register deficiencies in both qualita-

tive fluency and phonetic levelling processes in spontaneous speech production only when these become excessive (Kowal 1991).

The issues are affected in even more substantive ways by other ambiguities in the unfortunate term 'fast' speech. Thus so-called fast speech rules, the way the term is in fact used, typically denote perfectly normal fluent speech rather than unusually fast speech as the term would suggest. It would therefore be more accurate to speak of running speech rules, since 'fast' and 'slow' are not to be taken as polar opposites here but, on the contrary, intended to distinguish citation form pronunciation from dynamic speech realizations (still erroneously, though).

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TABLE 1

Average measures of Consonant Attraction [links], Alveolar Flapping [flaps], and Consonant Cluster Reduction [Cl-Red] per hundred syllables in casual and careful speech.

	CASUAL SPEECH	CAREFUL SPEECH	COMBINED AVERAGE
Links/100 syll.	M 12.12	M 12.95	M 12.53
	SD 4.22	SD 1.91	
Flaps/100 syll.	M 2.26	M 2.90	M 2.58
	SD 0.96	SD 1.19	
Cl-Red/100 syll.	M 2.23	M 1.99	M 2.11
	SD 1.72	SD 1.12	

TABLE 2

Average measures of careful speech styles per 100 syllables for three types of absorption: Linking; Levelling; Loss.

	Lectures	Speeches/Sermons	Interviews/ Panel Disc.	M	SD
Links/100 syll.	13.05	11.99	13.75	12.94	.89
Flaps/100 syll.	3.45	2.85	2.94	3.08	.32
Cl-Red/100 syll.	2.26	.42	2.89	1.86	1.28

TABLE 3

Ratio of actual occurrences to potential occurrences of Consonant Attraction [links], Alveolar Flapping [flaps], and Consonant Cluster Reduction [Cl-Red] in percent, in casual and careful speech.

	CASUAL SPEECH	CAREFUL SPEECH	COMBINED AVERAGE
Links	78.02%	77.56%	M 77.79%
Flaps	76.12%	78.21%	M 77.16%
Cl-Red	71.43%	76.74%	M 74.08%